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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/519,432	10/27/2005	Svend Kaasgaard	10300.204-US	7515

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EXAMINER	
GOUGH, TIFFANY MAUREEN	
ART UNIT	PAPER NUMBER
1651	

DATE MAILED: 04/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/519,432	KAASGAARD ET AL.	
	Examiner	Art Unit	
	Tiffany M. Gough	1651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 14-22 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 14-22 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 12/22/2004.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 14-22 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Specifically, the claims recite a method for fermenting any and all "bacterium", producing any and all "enzyme of interest". Thus, the claims encompass the fermentation of numerous potential bacteria to produce numerous potential enzymes of interest, for which no written description has been provided. Moreover , the sole examples using *Bacillus* sp. to produce a protease and an amylase does not provide a representative sample of the bacteria and enzymes encompassed by the claims, given the huge variation in phenotypic, genotypic characteristics and physical, structural, and chemical properties encompassed by the current broad claim language. Because the claims encompass a multitude of Genus, species and enzymes neither contemplated nor disclosed by the as-filed disclosure, it is clear that applicant was not in possession of the full scope of the claimed subject matter at the time of filing.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 14-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 14 recites "...wherein the compound is low metabolizable measured by (OD3-OD2)/(OD1-OD2)<25% as defined herein". It is unclear whether the OD taken, which is used to define the compound as "low metabolizable" is the OD of the fermentation media or of the compound itself. Given the compounds disclosed within applicants Markush group of claim 14, and the recitation of "wherein the compound is low metabolizable measured by ...as defined herein", it would appear as if the compounds listed would inherently possess the OD value as claimed by applicant.

Also "low metabolizable...<25%" is unclear because it does not indicate whether applicant is claiming a specific number less than 25, or if "low metabolizable" is specifically defined by the term "<25%" as a whole.

Further, "low metabolizable...as defined herein" is confusing as it does not specify **where** it is "defined" and what the specific OD values are.

The term "low" in claim 14 is a relative term which renders the claim indefinite. The term "low" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 14-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Brothers et al (U.S. Patent 4,673,647).

Applicant claims a method for fermenting a bacterium, specifically *Bacillus* sp., producing an enzyme of interest, specifically a hydrolase, in a culture medium of atleast 50 liters comprising adding one or more compounds in the amount of atleast 0.1%(w/w) selected from 1,2-propandiol, 1,3-propandiol, ethylene glycol, trehalose, xylitol, arabitol, dulcitol, mannitol, erythritol, cellobiose, sorbitol and a polyether having an average molecular weight less than 1000, either before and/or during fermentation, wherein the compound is low metabolizable measured by (OD3-OD2)/(OD1-OD2)<25%. Applicant also claims addition of a salt to the medium, such as a chloride, sulphate, phosphate, nitrate, and ammonium salt. The enzyme of interest, a hydrolase, is recovered after removal of the bacterium.

Brothers et al disclose a process for the recovery of enzymes obtained from a fermentation medium from a microorganism of interest. Specifically, Brothers discloses the recovery of alkaline protease and α-amylase from a *Bacillus* culture (see abstract). The enzyme is an extracellular enzyme, specifically proteases, amylases,

amyloglucosidases, lipases and oxidases, provided by an enzyme-containing solution produced by the fermentation, in a nutrient growth medium, of enzyme-secreting microorganisms , such as bacteria, yeast or fungi (see column 3, lines 60-68). Further, a precipitation agent, such as a salt or low molecular weight organic solvent, is added to the medium (see column 4,lines 12-16). Preferred salts are ammonium, phosphate and sulfate salts but any Group I or II metal salt is acceptable. A polyol solvent is also added to the fermentation medium to solubilize and recover the enzyme. Polyols may be 100% polyol or a mixture of a polyol and a compatible co-solvent. The polyols comprise low molecular weight polyethylene glycol ,1-2,propandiol, and the C2 through C8 alcohols having atleast two OH groups. C2-C8 alcohols with more than two OH groups may also be used. Such polyols include propylene glycol, glycerol, the low molecular weight (900 or less) polyethylene glycols and mixtures thereof and must be present in the medium of 20% and above (see column 5, lines 3-53). Brothers further discloses organic solvents such as propylene glycol, ethylene glycol and polyethylene glycol may also be used during enzyme preparation (see column 1, lines 50-53). Given that all compounds in the Markush group as claimed by applicant in claim 14 are polyols, all compounds are anticipated by Brothers et al.

Brothers discloses recovering alkaline protease and alpha-amylase from a 1000 Liter *Bacillus licheniformis* fermentation culture media , wherein the biomass in removed and alkaline protease is recovered after removal of the bacterium (see column 6 , lines 65 continued to column 7 up to lines 56).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 14-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brothers et al (U.S. Patent 4,673,647) in view of Schreiber (U.S. Patent 4,016,039) and GB 1001173 and Boyer et al (U.S. Patent 5,385,837).

Applicant claims a method for fermenting a bacterium, specifically *Bacillus* sp., producing an enzyme of interest, specifically a hydrolase, in a culture medium of atleast 50 liters comprising adding one or more compounds in the amount of atleast 0.1%(w/w) selected from 1,2-propandiol, 1,3-propandiol, ethylene glycol, trehalose, xylitol, arabitol,

dulcitol, mannitol, erythritol, cellobiose, sorbitol and a polyether having an average molecular weight less than 1000, either before and/or during fermentation, wherein the compound is low metabolizable measured by (OD3-OD2)/(OD1-OD2)<25%. Applicant also claims addition of a salt to the medium, such as a chloride, sulphate, phosphate, nitrate, and ammonium salt. The enzyme of interest, a hydrolase, is recovered after removal of the bacterium.

As stated above, Brothers et al disclose a process for the recovery of enzymes obtained from a fermentation medium from a microorganism of interest. Brothers differs from the claims in that, although they disclose any polyol , therefore, sugar alcohol may be used during the enzyme preparation, they do not specifically state trehalose, xylitol, arabitol, dulcitol, mannitol, erythritol, cellubiose and sorbitol. However, GB 1001173 discloses a process for the production of galactose oxidase from *Polyporus circinatus Fr.* in an aqueous fermentation medium containing up to 2% (w/v) of a carbohydrate source comprising one or more of galactose, lactose, sucrose, raffinose, glucose, fructose, mannose, sorbose, beet pulp, orange pulp, flour, starch and more specifically most effective are mannitol, sorbitol, inositol and glycerol (see column 1, lines 36-50 and column 3, lines 10-15). Mineral salts are also desirable in the fermentation medium such as sulphate, nitrate, and ammonium sulphate salts (see column 4, lines 70-80, 104-108). Further support of the use of carbohydrates and salts in a fermentation medium to obtain an enzyme of choice from a microorganism is disclosed by Boyer et al. They disclose obtaining an alkaline protease from *Bacillus proteolyticus* culture containing carbon sources such as glucose, mannose, fructose, mannitol, maltose,

cellobiose, sucrose, dextrin, flour and many others and salts such as potassium phosphate, calcium chloride, sodium sulphate and magnesium sulphate (see abstract and column 5, lines 65 continued to column 6, up to lines 56).

Schreiber also disclose a process for the recovery of proteins, specifically proteases, from fermentation solutions containing polyoxyethylene glycol having a low molecular weight between 500-800 in the amount of up to 3% by weight and salts such as sulphate and chloride salts(see abstract and column 1, lines 10-13).

It is well established that duplicating compounds or components with similar functions within a composition is obvious; see *In re Harza,* 274F.2d 669,124 USPQ 378 (CCPA 1960) and MPEP 2144.04. Polyols, i.e. sugar alcohols were known in the art at the time of the invention to solubilize and recover enzymes (see Brothers et al. column 5,lines 20-27).

One of ordinary skill in the art would therefore have been motivated by the combined disclosures of the references of the addition of many carbohydrates i.e. polyols and sugar alcohols to fermentation mediums to obtain an enzyme of interest, more specifically the addition of claimed polyols, which are disclosed as being acceptable and successful in a culture medium to obtain enzymes such as hydrolases.

Therefore, the claimed invention as a whole is prima facie obvious over the prior art.

Conclusion

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tiffany M. Gough whose telephone number is 571-272-0697. The examiner can normally be reached on M-F 8-5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Wityshyn can be reached on 571-272-0926. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

tmg